Gigantic debris avalanche deposit fans at paired volcanoes in the Trans-Mexican Volcanic Belt: Examples from Colima and Popocatepetl

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Cone collapse of strato-volcanoes and emplacement of debris avalanche deposits represent one of the largest hazards posed by volcanoes to nearby populations.
Volcan de Colima and Popocatepetl volcanoes are located at the southern, trenchward end of volcanic chains that are aligned in a N-S direction perpendicular to the main axis of the Trans Mexican Volcanic Belt,
Volcan de Colima (3980 m) is situated south of older Nevado de Colima (4375 m) and Popocatepetl (5452 m) is located to the south of older Ixtaccihuatl (5285 m) volcano.
In both cases the volcano located to the north is less active, suggesting a trenchward migration of magma production during the course of time.
Studies at the southern slopes of both Volcan de Colima and Popocatepetl revealed the existence of gigantic debris avalanche deposit fans composed of several superimposed and interdigitated debris avalanche deposits.
At Colima, 5 different deposits related to cone collapse were recognized, while at Popocatepetl 4 different deposits are identified so far.
Recurrence intervals at Colima range between about 3000 and 5000 y, while at Popocatepetl thesee intervals are much longer (at least 20,000 y.).
The differences in recurrence intervals appear to be related to differences in magma production rate, which at Colima is much higher.
Repeated cone collapse to the south appears to be related to trenchward migration of the sources of magma generation and to the buttressing effect of the masses of the older volcanoes to the north.
The large horizontal travel distances and area covered by each of the. debris avalanche deposits (more than 100 km distance at Colima, and more than 80 km at Popocatepetl) seem to be the combined effect of the great collapse volumes involved, large height of drop and favorable preexisting topography with little obstacles to surpass.
The above reasoning implies that the next cone collapses will most probably occur again with failure at the southern flanks and emplacement of debris avalanche deposits in the same direction as in the past.